

**New Hampshire Geological Survey
National Ground-Water Monitoring Network Project
(Cooperative Grant Agreement No. G18AC00089)
Final Project Report**

Submitted to:

**U.S. Geological Survey
Office of Acquisition and Grants
Attn: Daryll Pope**

By

**Frederick H. Chormann, Jr., State Geologist
Principal Investigator
New Hampshire Geological Survey
29 Hazen Drive, PO Box 95
Concord, New Hampshire 03302-0095**

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Introduction

The New Hampshire Geological Survey (NHGS) began participation in the National Groundwater Monitoring Network (NGWMN) in June of 2016. This document is meant to fulfill our obligation of a final project report for our 2019 grant, Cooperative Grant Agreement No. G18AC00089.

In our proposal, NHGS proposed the following tasks:

- Maintenance of current web services,
- Data gap filling for two newly added wells, and
- Well maintenance at ten wells and transducer installation at two wells.

NHGS has completed the tasks outlined under this project.

Network Data Gap Filling

In 2018, NHGS sought to expand our groundwater monitoring network in two geographic regions, the high elevation White Mountains and in our southeastern coastal lowland (see Figure 1). NHGS was successful in recovering a well, BBW-53, within the New Hampshire Seacoast Region. BBW-53 is a well that was completed in stratified glacial drift and is 23 feet deep. This well was installed in the 1980's as part of the cooperative USGS Stratified Drift Aquifer Mapping Project. Review of the surficial geology mapped for the area indicates the well was completed in the sandy facies of the Presumpscot Formation. The Presumpscot Formation is well recognized in Maine, New Hampshire and northern Massachusetts and is interpreted as sandy or silt and clay sediment deposited in peri- and proglacial environments within the Pleistocene ocean. Review of LiDAR elevation data corroborates this depositional interpretation.

Unfortunately, the White Mountain high elevation well, C.L. Graham was discovered to have been decommissioned following our discussions with the National Forestry Service managers. As a way to supplement this well, we tried locating at least one additional legacy well within the Swift River basin. However, searches for this well (USGS well ADW-16) proved unsuccessful.

As a way of evaluating the condition of BBW-53, NHGS conducted an optical survey of the well. The survey revealed that the PVC casing and screen were in good condition and that a minimal amount of sediment had accumulated in the bottom of the well.

NHGS also conducted GPS surveys of BBW-53 and CVW 02.1 (a well installed by USGS – Pembroke in 2018) for better horizontal accuracy location. This work was conducted with a Trimble Juno 3B and evaluated with 6-inch aerial orthophotography. The vertical elevations of the wells were derived using a Leica survey level and benchmarks established from LiDAR data. In using LiDAR data, an elevation was extracted from the DEM for a readily recognizable feature

(e.g., edge of pavement intersection) and using it as the elevation basis of the survey. The new elevations are provided in Table 1. The coordinates and elevations for BBW-53 and CVW 02.1 were also edited at the NGWMN portal.

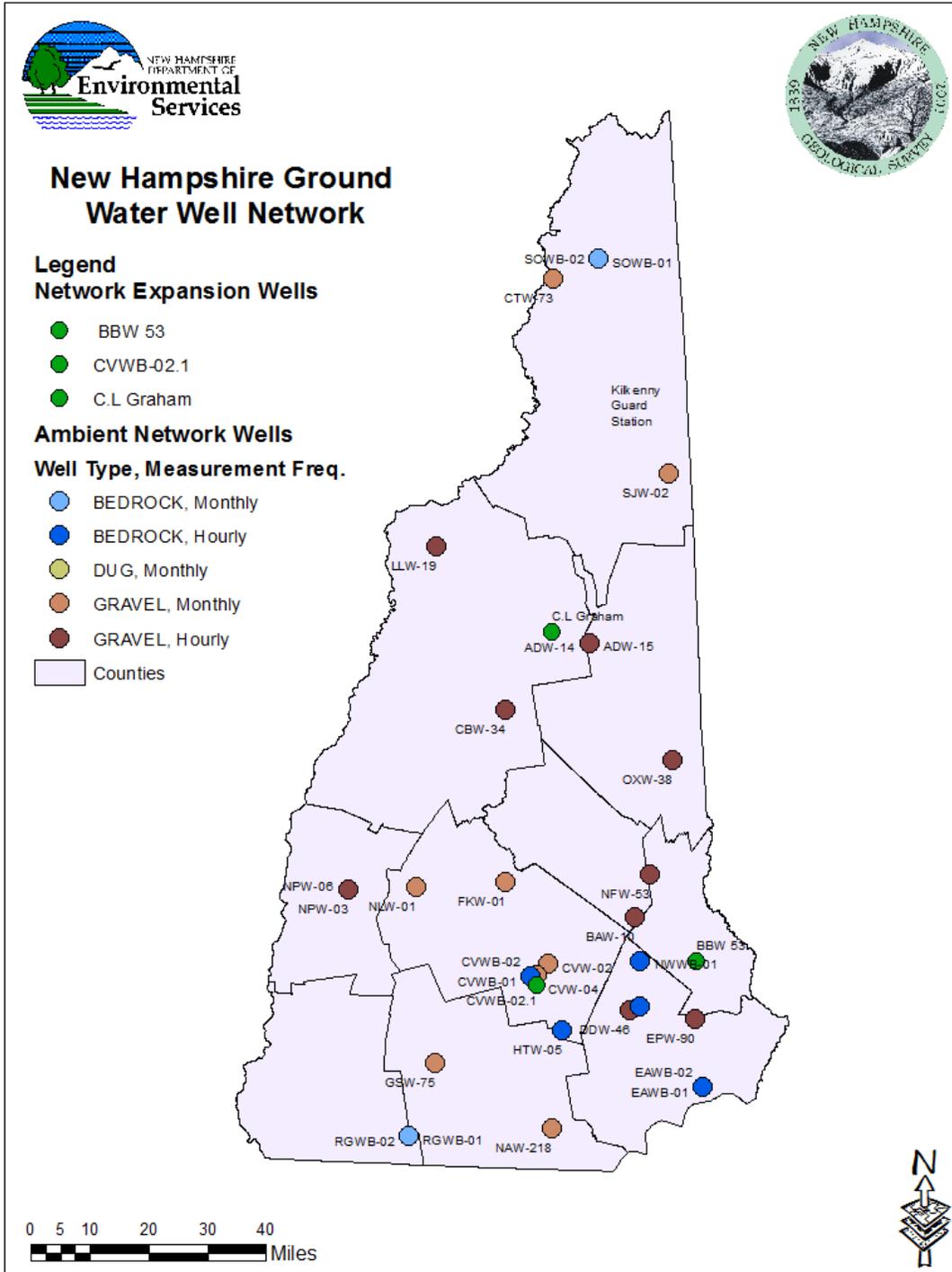


Figure 1 - Current NHGS Monitoring Network with Expansion Wells C.L. Graham, BBW-53 and CVW-02.1

Well Maintenance Activities

In coordination with our activities on our previous grant, NHGS conducted sediment removal operations in ten additional well locations, see Table 1 for the list of wells. The sediment removal was performed using a Waterra bailing system and was generally performed after “slug” tests were conducted (as part of the 2018 work scope). Overall, sediment accumulation within the network wells was fairly limited and purged water showed less sediment over time as each well was evacuated. We used a target of 3 well screen volumes per well to determine adequate redevelopment. In several cases, this was either not necessary (purged water cleared quickly of sediment) or couldn’t be achieved due to slow recharge volumes.

NHGS also installed transducer data loggers in wells BBW-53 and CVW-02.1. The loggers were configured to manufacturer’s specifications and have an hour sampling rate.

Table 1 – Summary of Well Maintenance, Testing and New Elevations					
NHGS Well ID	Town	Monitored Aquifer	Maintenance Performed	Hydraulic Testing	New Elevation (ft)
ADW-14	Albany	Overburden	Purged	Slug Test Completed	1249.64
ADW-15	Albany	Overburden	Purged	Slug Test Completed	1249.66
BAW-10	Barnstead	Overburden	Purged	Slug Test Completed	530.64
BBW-53	Barrington	Overburden	Purged	-	191.19
CBW-34	Campton	Overburden	Purged	Slug Test Completed	546.81
CTW-73	Colebrook	Overburden	Purged	Slug Test Completed	1042.94
CVW-02.1*	Concord	Overburden	-	-	338.33
CVW-04	Concord	Overburden	Purged	Slug Test Completed	291.62
CVWB-1	Concord	Bedrock	-	-	-
CVWB-2	Concord	Bedrock	-	-	-
DDW-46	Deerfield	Overburden	Purged	Slug Test Completed	270.12
DDWB-1	Deerfield	Bedrock	-	-	481.76
EAWB-1	East Kingston	Bedrock	-	-	-
EAWB-2	East Kingston	Bedrock	-	-	-
EPW-90	Epping	Overburden	Purged	Slug Test Completed	123.06
FKW-01	Franklin	Overburden	Purged	Slug Test Completed	281.30
GSW-75	Greenfield	Overburden	Purged	Slug Test Completed	898.43
HTW-05	Hooksett	Bedrock	-	-	262.04
LLW-19	Lisbon	Overburden	Purged	Slug Test Completed	598.02
NAW-218	Nashua	Overburden	Purged	Slug Test Completed	204.37
NFW-53	New Durham	Overburden	Purged	Slug Test Completed	542.26
NLW-01	New London	Overburden	Purged	-	1029.12
NPW-03	Newport	Overburden	Purged	Slug Test Completed	778.44
NPW-06	Newport	Overburden	Purged	Slug Test Completed	778.52
NWWB-1	Northwood	Bedrock	-	-	652.54
OXW-38	Ossipee	Overburden	Purged	Slug Test Completed	498.66
RGWB-1	Rindge	Bedrock	-	-	-
RGWB-2	Rindge	Bedrock	-	-	-
SOWB-1	Stewartstown	Bedrock	-	-	2229.80
SOWB-2	Stewartstown	Bedrock	-	-	2229.90

*Newly installed well

Data and Web Service Management

NHGS continues to collect, curate and store groundwater level data from our network of monitoring wells. These data are then exposed to the public through our web services. Over the last year, we have been engaged with USGS to ensure our web services are operating and providing data to the network.